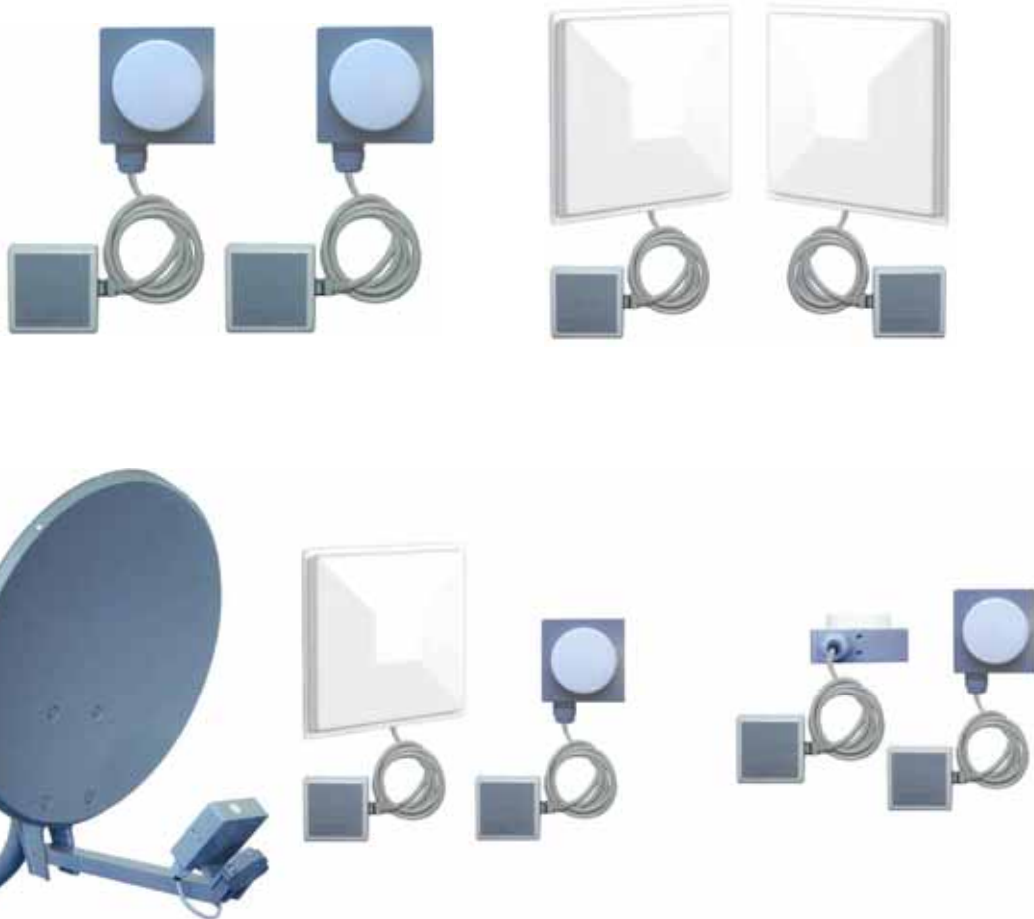# OPERATIONS MANUAL

MiniLink® Wireless Ethernet Systems

IMPORTANT SAFETY INSTRUCTION

For your protection, please read and observe all safety instructions before operating this system and keep this sheet and any additional instructions for future reference.

<u>INSTALLATION & USE</u>

OBSERVE WARNINGS: All warnings in the operating instructions should be carefully followed. Do not make any modifications to the WEM, PIM, or any other MicroTek electronic device, as the unit will no longer comply with FCC regulations and therefore cancel its warranty.

WATER AND MOISTURE: The Wireless Ethernet Modules used in this system are weatherproof provided they are installed in accordance to the mounting details listed on page 7 (or included dish manual for the 30-mile systems). However, further protection or housing is suggested for harsh environments, as moisture damage voids its warranty (as described on page 22). The Power Injection Modules used in this system are NOT weatherproof. None of the modules in this system are waterproof and should never be submerged. Severe electrical shock, personal injury or damage to the equipment may result.

POWER SOURCE: Connect the equipment to a power source only of the type described on the operating instructions or as marked on the equipment. Excessive or insufficient amperage or voltage can cause extended trouble-shooting or even damage that could negate its warranty. The power supplies' cable should not be modified/extended due to the ability to use up to 300 feet of power over Ethernet (see pg 7, part D). In addition, Ethernet cable running from the PIM to the WEM should be kept separated from high-voltage cables and/or transformers.

ATTACHMENTS: Use only MicroTek supplied or recommended Power Injection Modules, Power Supplies, CAT5 Cables and weather seals and plugs.

WHEN NOT IN USE: Unplug the power if the equipment is left unattended or unused for long periods of time or during lightning storms.

REPLACEMENT PARTS: When replacement parts are required, use only replacement parts specified by MicroTek Electronics, Inc. Unauthorized substitutions may result in damage to the system and will void the warranty.

FCC-Required Information Federal Communications Commission Radio Frequency Interference Statement for Class A Digital Devices

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment is designed to be professionally installed exclusively for fixed point-to-point applications. These products must be controlled due to radio frequency power output levels emitted with special consideration given to antenna placement as it relates to human exposure. Compliance is the responsibility of the installer and user.

Radio Frequency Interface Statement

This equipment has been tested and found to comply with the limits for an intentional radiator, pursuant to Part 15, Subpart C of the FCC Rules. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause interference to radio communications. The limits are designed to provide reasonable protection against such interference in a residential situation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna of the affected radio or television.
- Increase the separation between the equipment and the affected receiver.
- Connect the equipment and the affected receiver to power outlets on separate circuits.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded cables must be used with this unit to ensure compliance with Class A FCC limits. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the users authority to operate the equipment. Changes or modifications not expressly approved by MicroTek could void the users authority to operate the equipment.

FCC Output Power Restrictions

The FCC does not require licensing to implement this device. License-free operation in the industrial, scientific, and medical band is documented in FCC Rules Part 15.247. It is the responsibility of the individuals designing and implementing the radio system to assure compliance with any pertinent FCC Rules and Regulations. This device must be professionally installed.

Exposure to Radio Frequency Fields

The Minilink 5.8WES is designed to operate at 5.8 GHz with up to 50 Watts EIRP maximum transmit power. This level of RF energy is above the Maximum Permissible Exposure (MPE) levels specified in FCC OET65:97-01. The following precautions must be taken during installation of this equipment:
- The installed antenna must not be located in a manner that allows exposure of the general population to the direct beam path of the antenna at a distance less than 1 Meter. Installation on towers, masts, or rooftops not accessible to the general population is recommended; or
- Mount the antenna in a manner that prevents any personnel from entering the area within 1 Meter from the front of the antenna.
- It is recommended that the installer place radio frequency hazard warnings signs on the barrier that prevents access to the antenna.
- During installation and alignment of the antenna, do not stand in front of the antenna assembly.
- During installation and alignment of the antenna, do not handle or touch the front of the antenna.

These simple precautions must be taken to prevent general population and installation personnel from exposure to RF energy in excess of specified MPE levels.

Industry Canada Restrictions

This device is in compliance with the applicable sections of the Industry Canada RSS-210 Spectrum Management and Telecommunications Radio Standard Specification that governs Low Power License-Exempt Radiocommunication Devices. Specifically, the output EIRP of this device relative to antenna gain is factory set to ensure compliance with section 6.2.2(q1)(iv)(g).

In addition, it is noted for all users that high power radars are allocated as primary users (meaning they have priority) of the 5250-5350 MHz and 5650-5850 MHz frequency bands and these radars could cause interference and/or damage to LELAN devices such as are covered by this manual.

Environmental Limitations of FCC License-Free Wireless Devices

MicroTek products are engineered to the highest standards and designed to work in a variety of wireless applications and environments. A wireless environment includes not only a particular site in which the product is installed but also the installation itself and any extra materials that might be necessary to complete the wireless project. Due to the fact that environments and installations differ from site to site, MicroTek cannot control the variables required to ensure an ideal environment. Therefore, it is not possible to guarantee a successful application based on a drawing, application note, quote or other type of material that MicroTek may provide. Should a quote, drawing, etc. be made available, it is based on the performance of the WES product in an ideal environment with clear line-of-sight, absence of 5 GHz interference and/or frequency multi-path reflection. Therefore, MicroTek cannot be held responsible should the products not operate as desired or should additional products be required to complete a project. In addition, should a particular environment restrict the usage of the MiniLink WES in any way, MicroTek offers a thirty (30) day return policy from date of original shipment (see page 3).

INDEX

COVERED PRODUCTS

PART #	DESCRIPTION
ML WAP	MiniLink 5.3 & 5.8 GHz Wireless Host / Access Point - Directional
ML WAPOM	MiniLink 5.3 & 5.8 GHz Wireless Host / Access Point - Omni-directional
ML WSUOM	MiniLink 5.3 & 5.8 GHz Wireless Client / Subscriber Unit - Omni
ML WSU	MiniLink 5.3 & 5.8 GHz Wireless Client / Subscriber Unit - Standard
ML WSUP	MiniLink 5.3 & 5.8 GHz Wireless Client / Subscriber Unit - Patch
ML WSUDI	MiniLink 5.3 & 5.8 GHz Wireless Client / Subscriber Unit - Dish
ML WEM	MiniLink 5.3 & 5.8 GHz Wireless Ethernet Module
ML WEMP	MiniLink 5.3 & 5.8 GHz Wireless Ethernet Module w/ 6" patch antenna
ML WEM-30	MiniLink 5.8 GHz Wireless Ethernet Module - 30 mile system

***In this manual, WEM refers to all Point-to-Point, Host/Access Point and
Client/Subscriber Unit devices as described in the covered products table above.**

QUICK START GUIDE

MicroTek Electronics, Inc. recommends that all equipment be bench tested before being installed onsite. This test will ensure the equipment is functioning properly.

WIRELESS ETHERNET MODULE (WEM) SETUP

1. Remove the WEMs from box, select frequency via the rotary switch at the side of the unit. (Factory set to channel 1 – channels 0, 1 & 2 are the same frequency) The channels of each set of WEMs must be matched for the WEMs to communicate with each other. For multi-connect devices, each Client SU WEM must be set to the same channel as the Host AP WEM it will be connected to. If connecting more than one Client SU WEM to a Host AP WEM, please see the advanced operation section of this manual for setup.
2. Mount the first WEM at the desired location.
3. Point the WEM as accurately as possible to the point where the second matched WEM or Host AP WEM will be mounted.
4. Remove the Power Injection Modules (PIMs) from the box and determine where they will be located for each WEM. The total distance between a WEM and connected Ethernet device cannot exceed 300 feet (100 meters). The PIMs can be located anywhere along the 300 feet of CAT5 cable. Connect standard CAT5 straight through cable to the "Ethernet Out" port on each PIM to its corresponding WEM. The "Ethernet In" port on each PIM should be connected to its respective Ethernet device using a standard CAT5 straight through cable. A crossover cable may be needed depending on your Ethernet device.
5. Connect the included power supplies to the "Power In" port on the PIMs and plug the transformers into a standard 110VAC outlet. If the Ethernet devices on each end are connected, powered up and aimed correctly, the "Link Activity", "Power" and "Signal Level" LEDs will illuminate. If the Ethernet device is not connected the "Power" LED and "Signal Level" LEDs only will illuminate. If the "Signal Level" LED is flashing, the WEMs are communicating but at slower rate than 20 Mbps. Reposition the modules to achieve max signal strength. For multi-connect applications, the Each Client WEM will show a solid green light when connected to a Host AP WEM. A flashing green LED on the "Multi-point Host AP" will indicate the number of Client Subscriber Units to which it is connected.

   Note: If a dish is used with the system, assemble the dish and mount the WEM in the dish as described in the dish installation instructions. Position the dish with WEM and connect the CAT5 cable as described above.

Trouble Shooting: If the signal level indicator is not fully lit, video does not appear on the screen or you are having other operational difficulties, please visit the trouble shooting section on page 20 of the operations manual or contact MicroTek toll free at (888) 366-4276 for technical assistance.

PRE-INSTALLATION REMINDERS

The information on the Quick Start Guide is intended for ease of use and application, the following reminders will help to ensure your satisfaction with MicroTek products and service.

1. Read through this manual before bench testing and installation
2. Perform a bench test incorporating all components of the application
3. Install your MiniLink Wireless Ethernet System
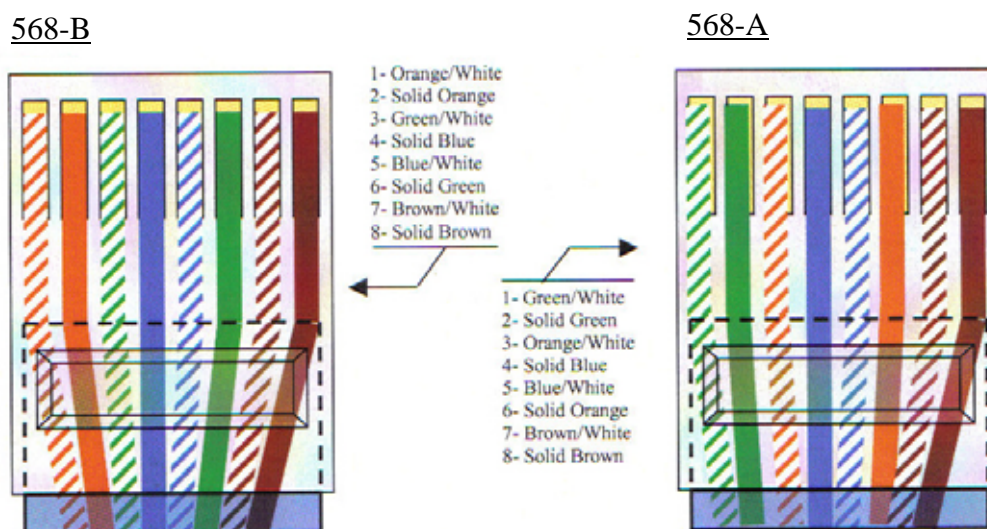4. Toll-free technical assistance is available Monday through Friday (8-5pm PST) at 888-366-4276

MICROTEK ELECTRONICS RETURN POLICY

MicroTek Electronics products come with a 2-year limited warranty, (see the last page for warranty information) unless otherwise specified. In addition to the 2-year warranty, products may be returned within thirty (30) days of shipment provided the products are in like new condition and in the original packaging. Contact your MicroTek Electronics dealer or distributor to obtain an authorization to return the merchandise for credit.

Return authorizations for repair can be sent directly to Microtek Electronics with a valid RA number. Call MicroTek Electronics to obtain an RA number for repair.

ETHERNET STANDARD WIRING NOTE

The Ethernet standard straight-through cable configurations used must be configured to one of the two Ethernet standards (568-A or 568-B) in order for the WES system to operate correctly. Any deviation from one of the two standard configurations can lead to undesired activity so make sure your cables are configured as shown in one of the drawings below:

568-B

568-A

1- Orange/White
2- Solid Orange
3- Green/White
4- Solid Blue
5- Blue/White
6- Solid Green
7- Brown/White
8- Solid Brown

1- Green/White
2- Solid Green
3- Orange/White
4- Solid Blue
5- Blue/White
6- Solid Orange
7- Brown/White
8- Solid Brown

- Drawing shown with gold pins facing up and RJ-45 clip in rear (clip not shown)
- If 568-B is configured on end of a CAT5 cable and 568-A is configured on the other end, that configuration would be a standard crossover cable.

MINILINK WIRELESS ETHERNET SYSTEM (WES)

The MiniLink WES is a plug and play CAT5/Ethernet cable replacement device. It operates in the 5.3 and 5.8 GHz U-NII bands on 8 non-overlapping channels. The WES system enables a wide variety of IP cameras, DVRs, encoders/decoders and web servers to be used across wireless line-of-sight links in ranges of 500 feet to 30 miles. The system operates independent of any network it may be connected to.
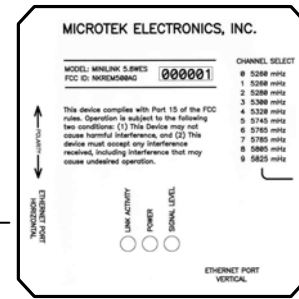
MINILINK WIRELESS ETHERNET MODULE (WEM)

WEM DESCRIPTION

A. FRONT VIEW
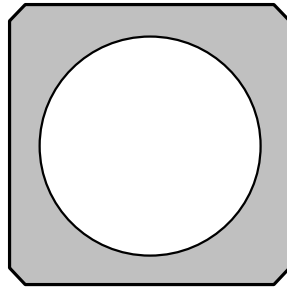
B. REAR VIEW

NOTE: Horizontal Ethernet Port is not available. Mount WEM so that Vertical Ethernet Port is at bottom and use weatherproof caps and plugs as described on pg 7.

1. LINK ACTIVITY LED
   Indicates that a solid Ethernet link is connected between powered Ethernet device & WEM.

2. POWER LED
   Indicates the WEM has power.

3. SIGNAL LEVEL LED
   Indicates the signal strength level between WEMs. On the Host AP WEM, indicates the number of Client SU WEMs connected. Note: This is not an indication of available throughput.

4. ETHERNET PORT
   Standard RJ-45 connector.

5. CHANNEL SELECT
   Rotary switch for channel selection, factory set to Channel 0.
   Note: Channel positions 0, 1 and 2 are all the same frequency- next available frequency is Channel 3.

C. SIDE VIEW
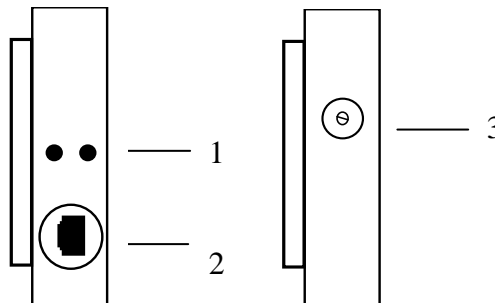
1. MOUNTING HOLES
    (2) ¼ - 20 mounting holes – Attach the outdoor mounting equipment as described in detail on page 7 of this manual.

C. SIDE VIEW (cont'd)

   2.   ETHERNET PORT
        Standard RJ-45 connector.

   3.   ROTARY CHANNEL SELECT SWITCH
   Shows switch settings for channels 0 – 9.
        Note: Channels 0, 1 and 2 are the same frequency. If two or more systems are in use and either channel 0, 1 or 2 are used on the first system, the following systems must be set to channel 3 or higher. If the second system is not set to channel 3 or higher, the two systems could interfere with one another. When changing channels, power to each WEM must be cycled for the WEM to recognize and operate on the new channel.

POWER INJECTION MODULE (PIM)

Note: The Power Injector Modules are not weatherproof units and must be protected from moisture.

PIM DESCRIPTION

   A. TOP VIEW
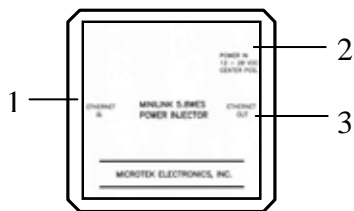
1. ETHERNET IN – Connect to Ethernet device

2. POWER IN – 12-20 VDC Center Positive

3. ETHERNET OUT – Connect to WEM

   B. RIGHT SIDE VIEW
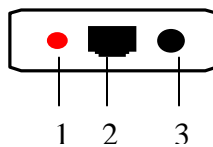
1. POWER LED – Lit when power is on

2. ETHERNET OUT – Connect to WEM

3. POWER IN – Connect to Power Supply

   C. LEFT SIDE VIEW
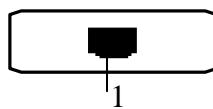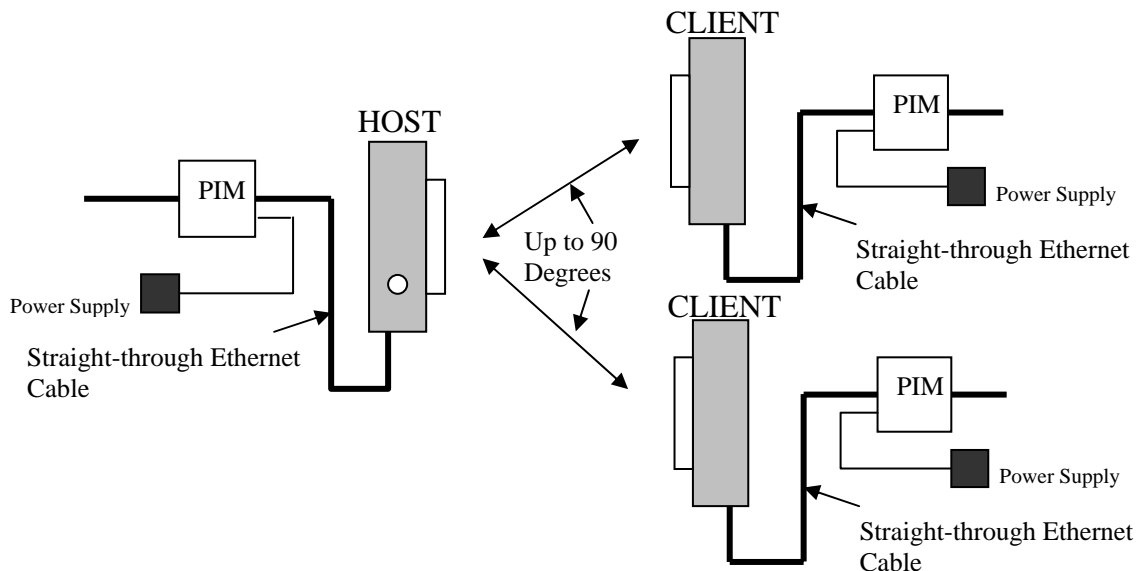
1. ETHERNET IN – Connect to Ethernet device

WES CONNECTION DIAGRAM

The following wiring schemes represent the configurations that have been tested and verified by MicroTek Electronics based on typical Ethernet wiring solutions. Other wiring configurations could be possible based on the application. A bench test is recommended to verify the designs below.

A. POINT-TO-POINT SYSTEM

Receive Location

HOST

CLIENT

Transmit Location

PIM

Power Supply

Straight-through Ethernet Cable

PIM

Power Supply

Straight-through Ethernet Cable

B. MULTI-CONNECT SYSTEM

CLIENT

HOST

PIM

Power Supply

Straight-through Ethernet Cable

PIM

Power Supply

Straight-through Ethernet Cable

Up to 90 Degrees

CLIENT

PIM

Power Supply

Straight-through Ethernet Cable
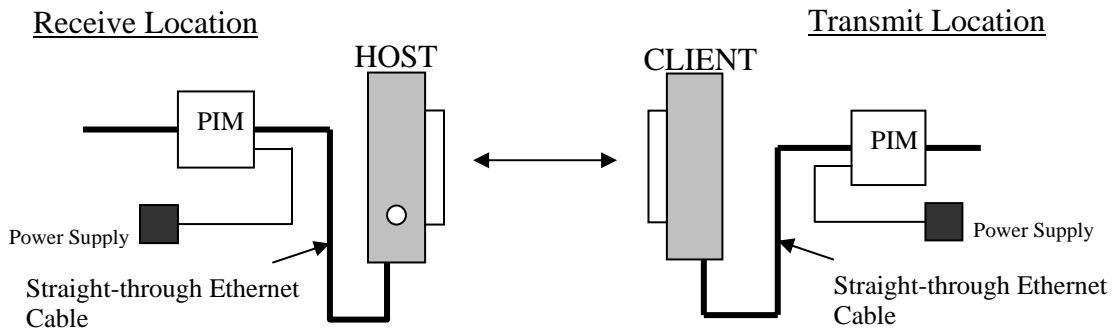
Note: The Ethernet/IP device connects to the "Ethernet In" RJ45 Ethernet port on the PIM. Depending on the Ethernet/IP device you are using, a crossover cable may be needed.

WEM INSTALLATION & OPERATION

A. SELECT CHANNEL

Locate and remove the ½ inch diameter plug at the side of the WEM. Select the channel the system will operate on. Each WEM pair or group must share the same channel to communicate properly. Replace the ½ inch diameter plug after the channel has been selected.
Note: Power to the WEM must be cycled for the WEM to recognize a new channel.
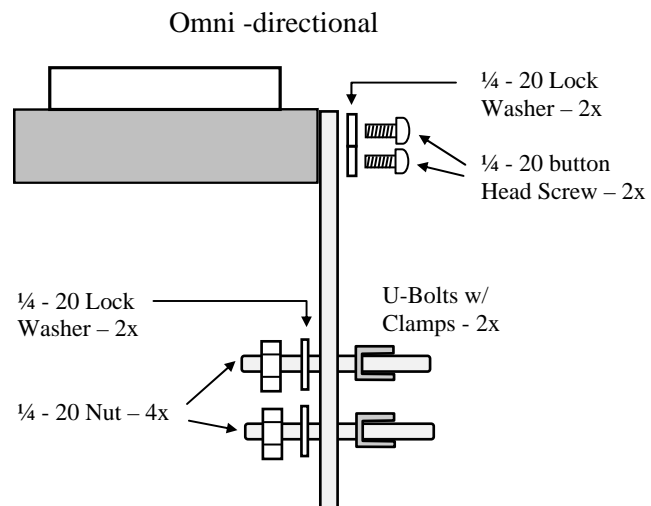
WEM INSTALLATION & OPERATION (cont'd)

B. MOUNT DIRECTIONAL WEM

Mount the WEM with the included wall/pole mount bracket and hardware. Connect the mounting block with ball adjustment to mounting bracket with the ¼ - 20 button head screw. Connect the WEM to the mounting block using the ¼-20 mounting holes in the WEM. Position the WEM and point it in the desired direction Tighten the jam nut against the bottom of the WEM case to lock it in position.

B-1

B-2

Directional WEM

¼ - 20 Button Head Screw - 1x

U-Bolts w/ Clamps - 2x

¼ - 20 Lock Washer – 5x

¼ - 20 Nut – 4x
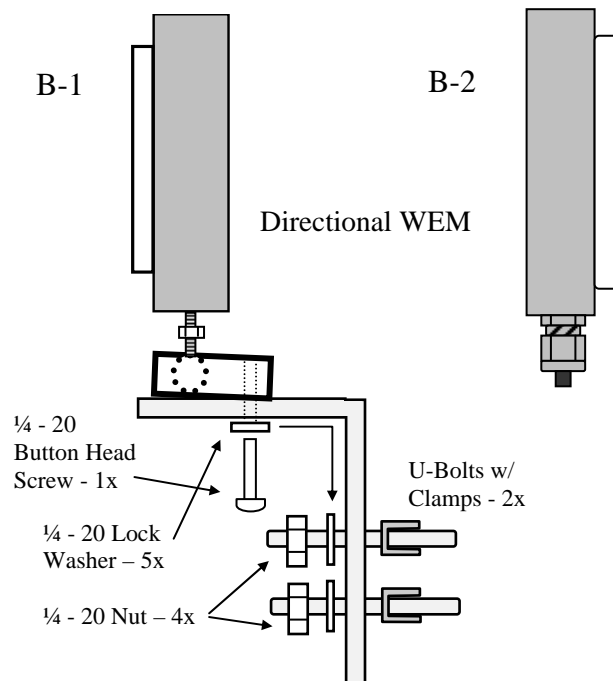
C. MOUNT OMNI-DIRECTIONAL WEM

Mount the WEM with the included wall/pole mount bracket and hardware. Connect the WEM to the wall/pole mount bracket using the ¼-20 button head screws and lock washers.

Omni -directional

¼ - 20 Lock Washer – 2x

¼ - 20 button Head Screw – 2x

¼ - 20 Lock Washer – 2x

U-Bolts w/ Clamps - 2x

¼ - 20 Nut – 4x

D. CONFIGURE CABLE

Determine the length of CAT5 cable that will be needed and where the PIM will be located. The total cable length from the WEM to the Ethernet device cannot exceed 300 feet, however, the PIM can be located anywhere along the 300 feet of cable. The PIM and power supply are not weather proof and must be placed indoors or in an environmental enclosure. On the WEM end, feed the CAT5 cable through the supplied weatherproof connector. Slide the supplied black cable jacket over the cable. Crimp an RJ45 CAT5 connector on the end of the cable and configure as a straight-through cable.

WEM INSTALLATION & OPERATION (cont'd)

E. CONNECT WEM
Connect the cable to the WEM. Slide the cable jacket up to the base of the connector. Slide the weatherproof connector over the cable jacket and screw it into the WEM and tighten. Tighten the clamping nut until the CAT5 cable is sealed in the connector. Check the WEM positioning and make sure the Power and Link Activity LEDs are on. The Link Activity indicator, amber LED, will only illuminate if an Ethernet source device is connected and powered up, and the red LED will verify power is being sent over the Ethernet cable. See drawing B-2 (page 7).

F. ESTABLISH LINK
Follow above steps, A through E, for both ends of the link to be established. After both ends have been installed and powered up, the green Signal Level LED will illuminate. A solid green LED indicates the WEMs are communicating at a maximum throughput standard rate of up to 20 Mbps. If the green LED is flashing, the WEMs are communicating at a level less than 20 Mbps. If this occurs, realign the WEMs to achieve the maximum throughput.

NOTE: Maximum throughput requires a line-of-sight transmission path between the WEMs and no 5 GHz interference. In some cases, depending on the physical and RF environment, a useable throughput rate may not be possible. Contact MicroTek for more information – 888-366-4276 or info@microtekelectronics.com.

ADVANCED OPERATION

WEB BROWSER INTERFACE

Each WEM has a web browser interface to access the advanced setup functions. If changing advanced settings, be sure to connect and power the WEMs individually. To access this interface, connect the WEM to the Ethernet port on a computer, launch the web browser and type in the default IP address. The configuration of the computer used to access the WEM may need to be changed depending on its IP settings. The IP address of the computer should be changed to 192.168.1.xxx. The xxx setting can be any address 2 – 254 excluding 200 and 201 or any other IP address(s) you wish to use for a WEM (or Encoder/Decoder solution if applicable). The Subnet mask should be 255.255.255.0. If you have any questions or concerns about changing these settings, please contact your network administrator. The default user name for each WEM is <u>admin</u> and the password is <u>admin</u>.

<u>WARNING</u>: IF YOU CHANGE THE USER NAME AND/OR PASSWORD, YOU WILL NEED TO KEEP A RECORD OF YOUR CHANGES IN A SAFE PLACE. IF THE USER NAME AND/OR PASSWORD IS FORGOTTEN OR MISPLACED, THE WEM MUST BE RETURNED TO MICROTEK TO BE RESET.

A. POINT-TO-POINT SYSTEMS
A point-to-point system consists of a Host AP WEM and a Client SU WEM. The default IP address for the Host AP WEM is 192.168.1.200. The default IP address for each Client SU WEM is 192.168.1.201. To access the either WEM unit, type in the default IP address of the unit you wish to connect to.

B. MULTI-CONNECT SYSTEMS
The default IP addresses for each Host AP WEM is 192.168.1.200. To access the Host AP WEM, type in the default IP address 192.168.1.200. The default IP address for each Client SU WEM is 192.168.1.201. If more than one Client SU WEM will be connected to a Host AP WEM, the IP address of each additional Client SU WEM will need to be changed in the

B. MULTI-CONNECT SYSTEMS (cont'd)

Administration Page (Section E below) manually. If you ordered a complete system with multiple Client SU WEMs, they have been pre-configured with IP addresses as follows:

Client SU WEM	Serial Number	IP Address
Unit 1	00511*	192.168.1.201
Unit 2	00512*	192.168.1.202
Unit 3	00553*	192.168.1.203
Unit 4	00624*	192.168.1.204
Unit 5	00714*	192.168.1.205

(*Actual serial numbers will be different)

Note: The lowest serial number of the Client SU WEM you received is pre-configured with IP address 192.168.1.201. The next higher sequential serial number of the Client SU WEMs you received has IP address 192.168.1.202, etc. If you ordered an additional Client SU WEM separate from your original order, the default address is 192.168.1.201. The IP address in this additional unit will need to be changed manually to the next available IP address before installation. An IP address-numbering table is included in the **SYSTEM INSTALLATION NOTES** section of this manual on page 17 for your convenience in keeping track of IP address changes and other notes about your specific application. The green LED on a multi-connect Host AP will flash to indicate the number of Client SU units connected to it.

WEB PAGES

A. LOGIN
The default user name for each WEM is <u>admin</u> and the password is <u>admin</u>.
Note: The user name and password are case sensitive.
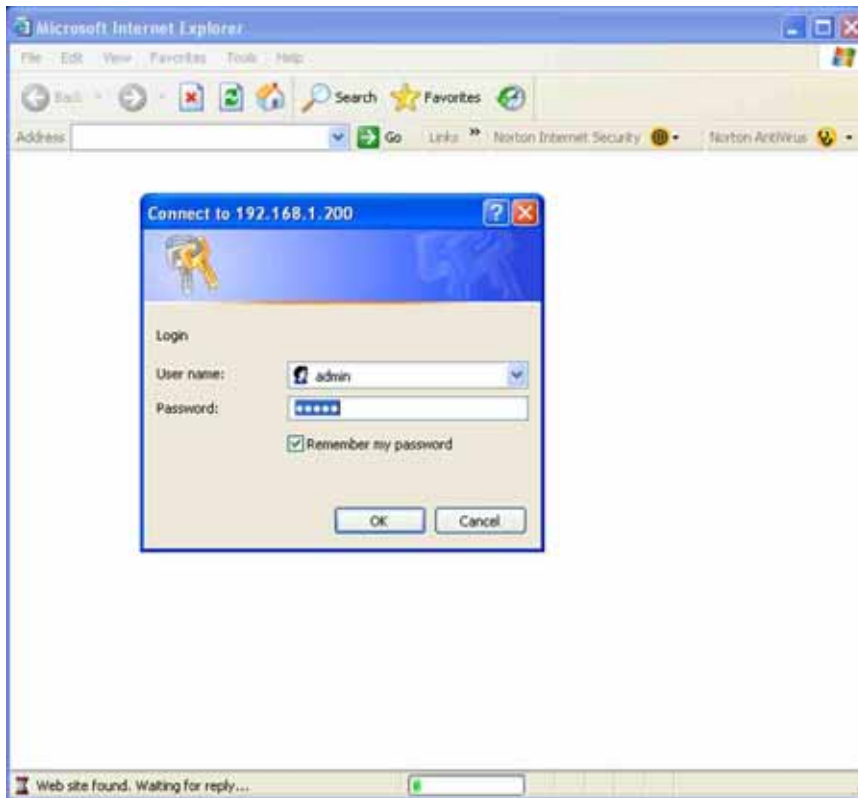
B. INFORMATION

1. POINT-TO-POINT HOST AP WEM
The information page provides the details of how the Single-Point Host WEM is configured.
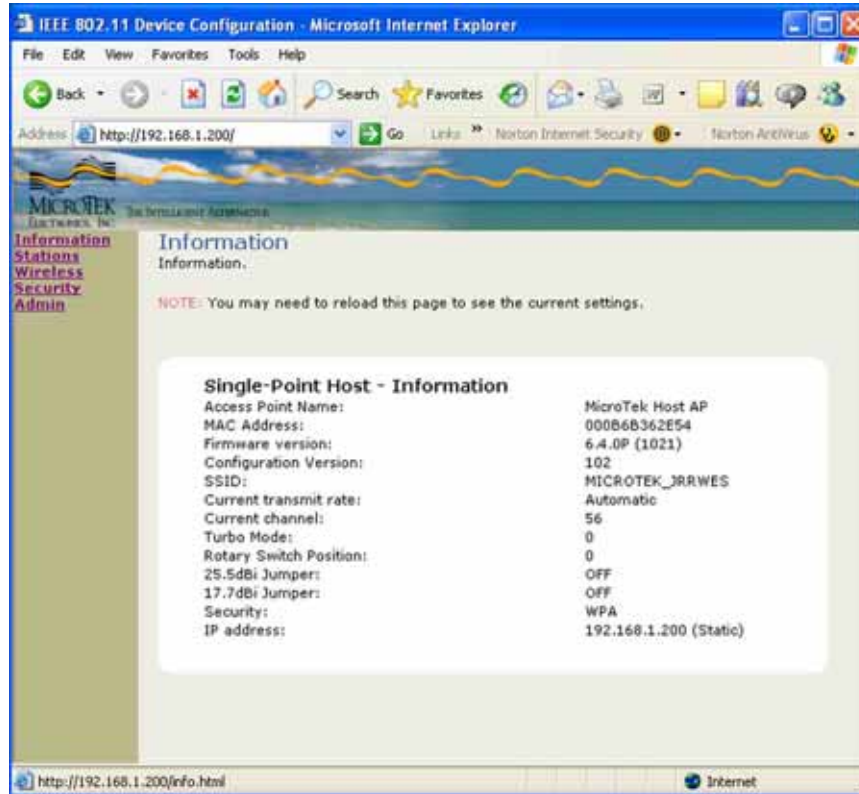
Access Point Name: In most cases, the Access Point, or Host, is the receiving unit
Bridge Name: The subscriber or client unit is the transmitting device
MAC Address: Individual Ethernet device identification code
Firmware Version: The latest firmware version is 6.4.0P (7.01)
Current Channel: Refer to "Rotary Switch Position" for actual frequency channel
Turbo Mode: 0= default (off), 1 or 2= on, both units must be on channel 3,6 or 8 to turn turbo mode on
Rotary Switch Pos: Indicates what channel the software has determined that has been enabled
25.5dBi Jumper: "On" for: MLWES-30. Client "on" for: MLWES-D6 or MLWSU-DI
17.7dBi Jumper: "On" for: MLWES-2-4. Client "on" for: MLWSUP
Security: WPA AES 128 bit is standard default, WEP can also be enabled
IP address: Shows the IP address of the connected WEM and can be changed as desired

A. INFORMATION (cont'd)

    2. MULTI-CONNECT HOST AP WEM
       The information page provides the details of how the Multipoint Host WEM is configured.
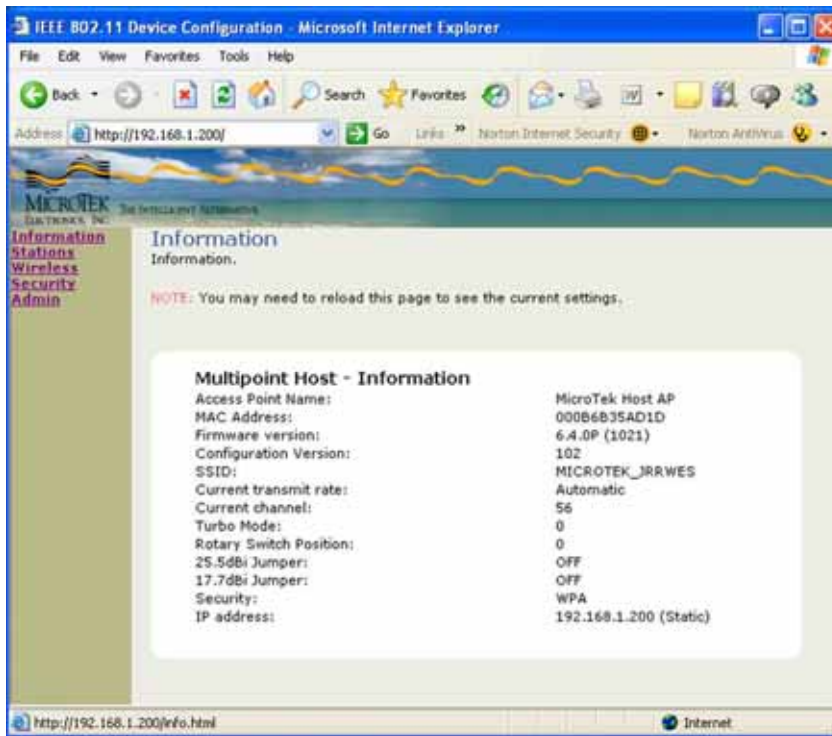
    3. CLIENT SU WEM
       The information page provides the details of how the Client WEM is configured.
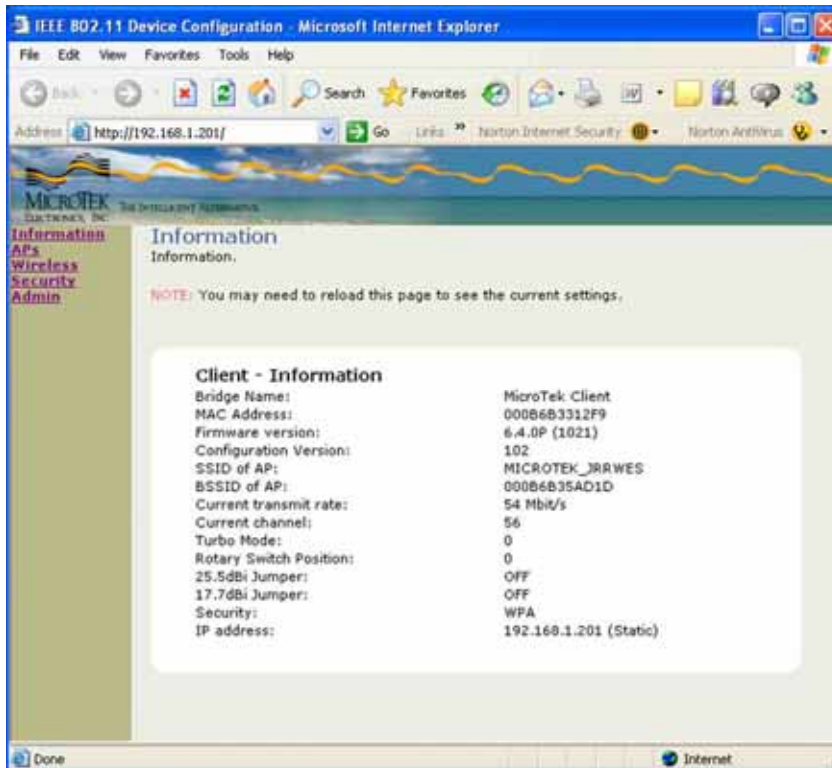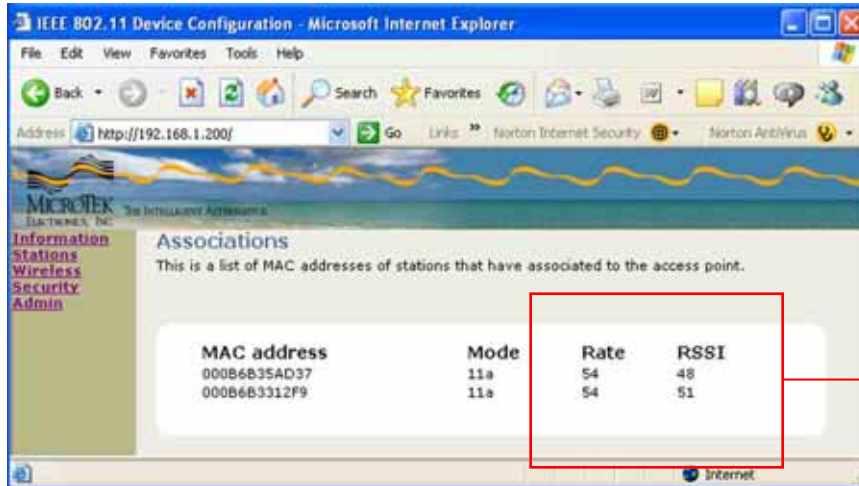
C. STATIONS/APs

1. POINT-TO-POINT AND MULTI-CONNECT HOST AP WEMS
    The Stations/Associations page of the Host AP WEM shows the MAC address(s) of the paired or grouped Client SU WEM(s) the Host AP WEM is connected to. For Point-to-Point systems, one WEM MAC address will be shown. For Multi-connect systems, the Host AP WEM will show all of the Client SU WEM MAC addresses currently connected. The page will also show the mode, rate and RSSI communication information for each connected Client SU WEM.
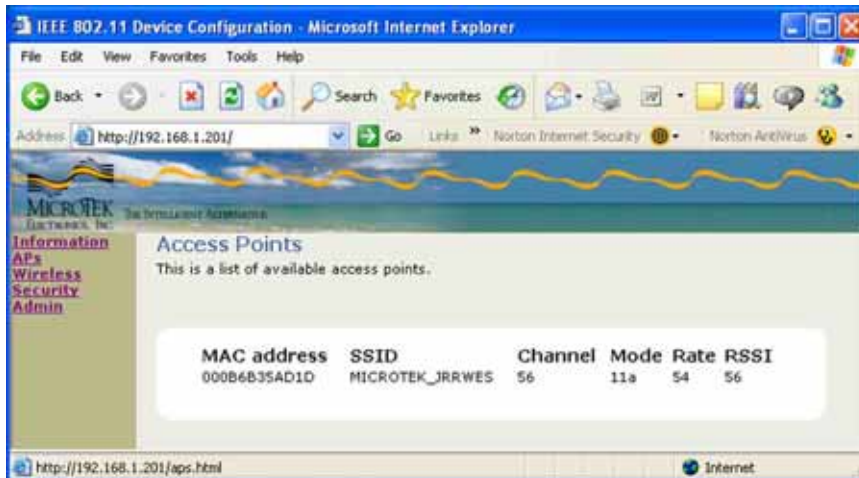
RSSI= Received Signal Strength Indicator. (Max 70) Rate= This is a snapshot of the rate in Megabits/sec of the last packet as it went across the link*

2. CLIENT SU WEM
    The APs/Access Points page shows the MAC address(s) and SSID of the Host AP WEM the Client SU WEM is connected to. It also shows the channel the units are connected on along with mode, rate and RSSI communication information.

* The Rate as shown on these web page snap-shots do not account for roughly 60% of over-head.

D. WIRELESS

The wireless page is used for enabling Super mode. The Super mode combines adjacent channels to provide up to 50+ Mbps of throughput. The channels available in Super mode are: 3, 6 and 8 only. If another channel is selected, Super mode will not be enabled. To enable Super mode, click the arrow in the drop down box and select "Super A without Turbo" (30+ Mbps) or Super A with Static Turbo" (50 Mbps). Each WEM in your system will need to have this feature enabled independently.
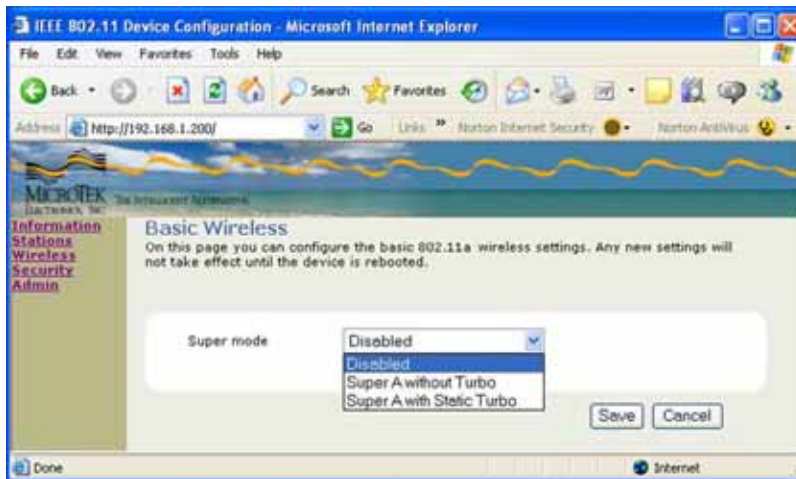
E. SECURITY

1. WPA CONFIGURATION
WPA is the highest grade of encryption available in this system and is enabled at the factory as the default. WPA2, AES and password are the default selections. After updating the settings as desired, click save to update the WEM. Please note that paired or grouped WEMs must have the same settings to operate correctly.
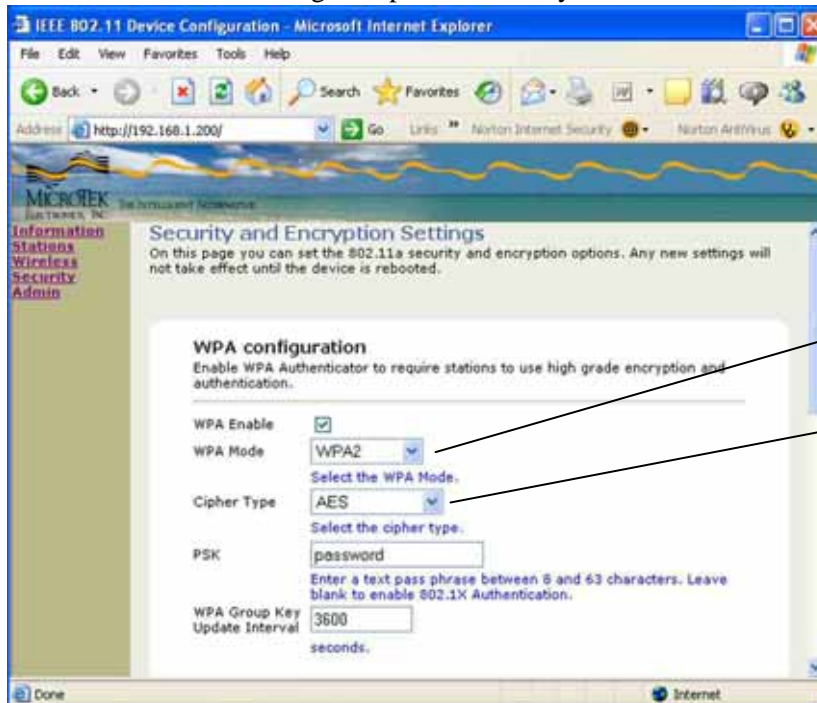
NOTE: Client SU WEMs do not have the option of leaving the PSK blank or a WPA Group Key Update Interval selection.

D. SECURITY (cont'd)

   2. WEP CONFIGURATION
      The security page is used for enabling WEP encryption and setting the parameters for WEP
      encryption. Click the "Enable WEP" check box to enable (The WPA configuration will be
      automatically disabled). After this box is checked, the Default WEP key is available, as are:
      Authentication, WEP key lengths and WEP Key 1-4. After updating the settings as desired,
      click save to update the WEM. Please note that paired or grouped WEMs must have the same
      settings to operate correctly.
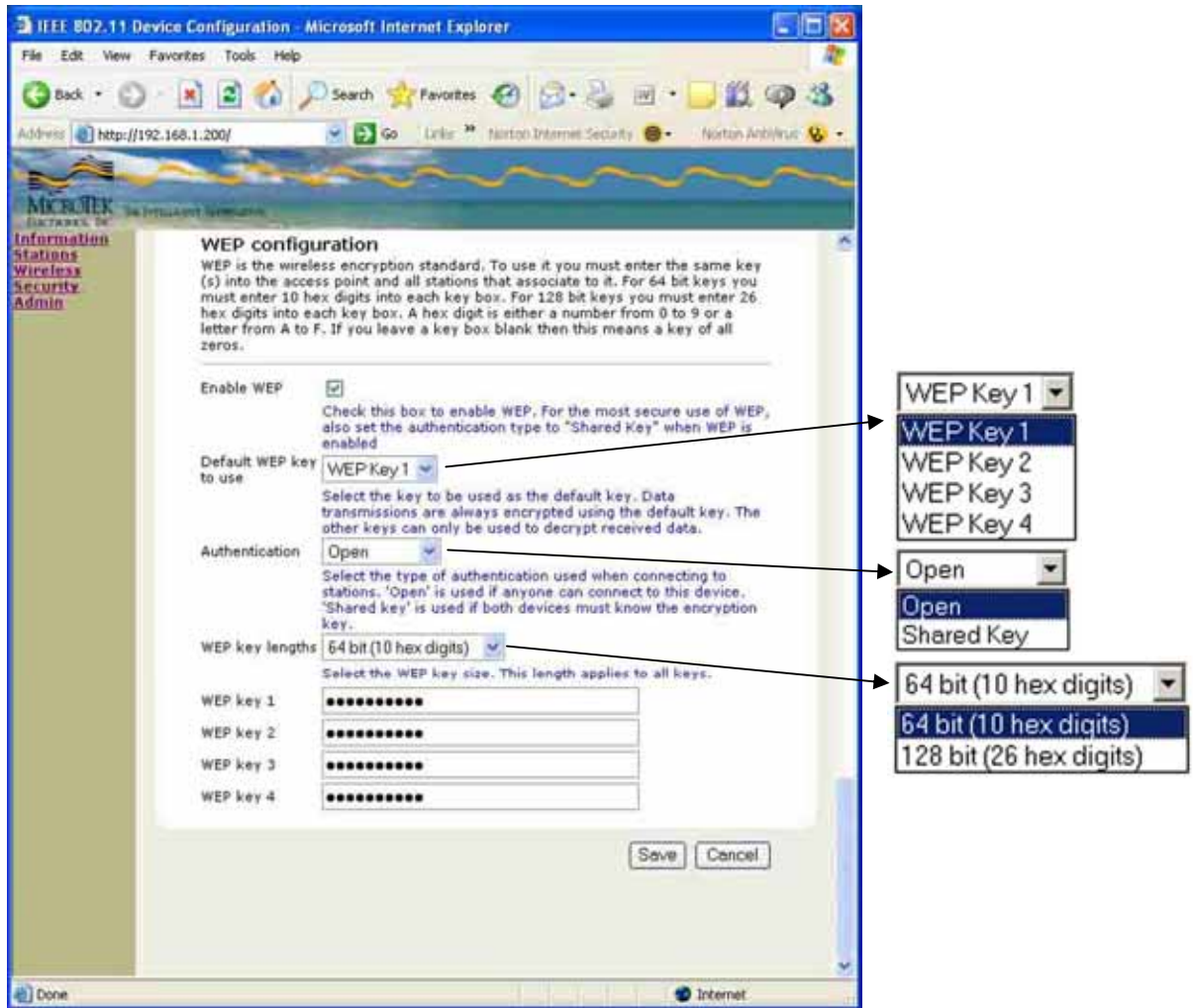
WEB PAGES (cont'd)

F. ADMINISTRATION

This section of the Administration page is used for rebooting the WEM, resetting the default configuration and/or upgrading/uploading the firmware in the system.
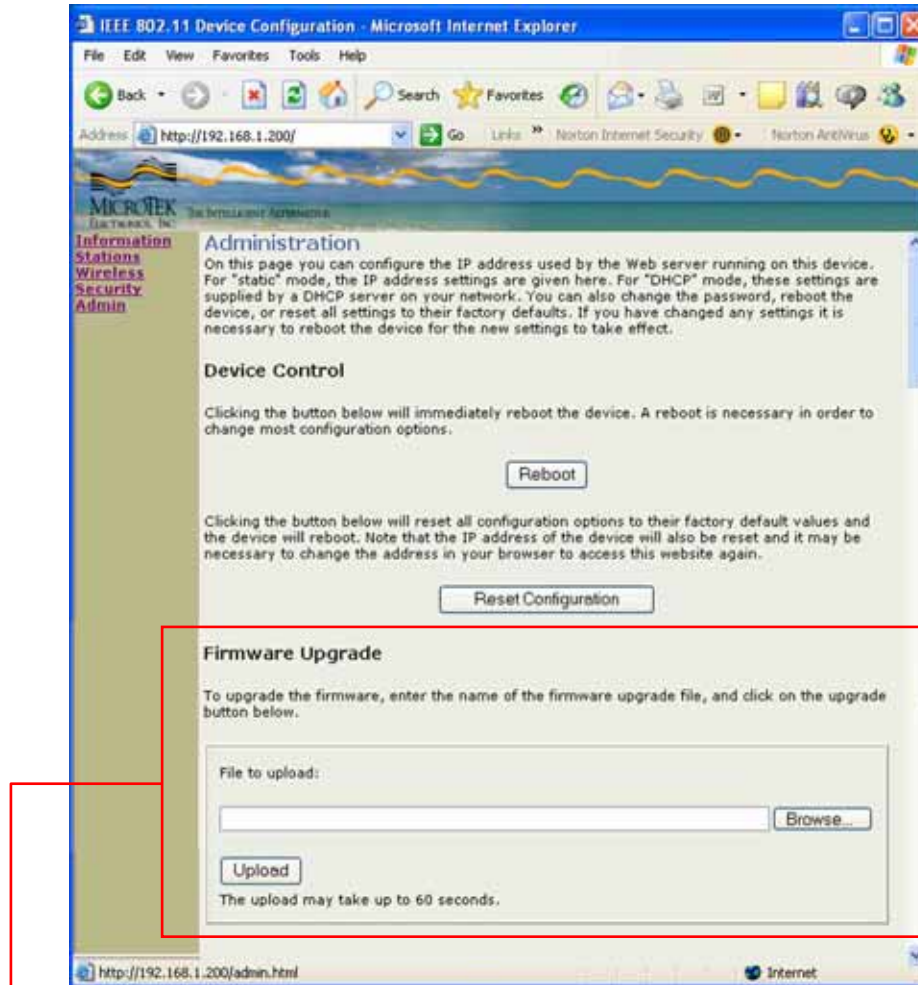
Contact MicroTek to obtain the files for a firmware upgrade. The latest firmware is 6.04P (7.01). Once the file(s) is/are received, save it/them a file to be easily accessed in your computer and click "Browse" to search for the file to upload. Then click "Upload" and wait for up to sixty seconds as the WEM reboots. Make sure all WEMs that will be communicating with one another are also uploaded with the correct firmware.

NOTE 1: *In a point-to-point configuration*, the receiving WEM should be updated with the Single-point Host firmware and the transmitting WEM will need to have the Client firmware uploaded to it.

NOTE 2: *In a point-to-multipoint configuration*, the receiving WEM will be updated with the Multi-point Host firmware and the transmitting WEM(s) will need to have the Client firmware uploaded to them.

E.   ADMINISTRATION (cont'd)

This section of the Administration page is used for selecting the device name, changing IP settings and changing the user name and password needed to access the system.

NOTE:

 The Device name on the Admin page of a HOST AP will be "MicroTek Host AP".

The Device name on the Admin page of a Client SU will be "MicroTek Client".

For Point-to-Point systems default IP addresses will be as follows:

Host AP: 192.168.1.200
Client SU: 192.168.1.201

Please see Advanced Operation starting on page 8 for systems utilizing multiple Client SU WEMs.

SYSTEM INSTALLATION NOTES

A. SYSTEM LOCATION

    1. Address: _____

    2. Contact: _____

    3. Phone Number: _____

B. IP ADDRESS AND SERIAL NUMBERING TABLE FOR CUSTOM APPLICATIONS

Site #1		
Device	**Serial Number**	**IP Address**
WEM #1 (point-to-point applications)		
WEM #2 (point-to-point applications)		
Host AP WEM		
Client SU WEM #1		
Client SU WEM #2		
Client SU WEM #3		
Client SU WEM #4		
Client SU WEM #5		
Client SU WEM #6		
Site #2		
Device	**Serial Number**	**IP Address**
WEM #1 (point to point applications)		
WEM #2 (point to point applications)		
Host AP WEM		
Client SU WEM #1		
Client SU WEM #2		
Client SU WEM #3		
Client SU WEM #4		
Client SU WEM #5		
Client SU WEM #6		

C. NOTES: _____

_____

_____

_____

_____

_____

If you have any questions regarding the advanced setup of the MiniLink Wireless Ethernet System, please contact MicroTek's Technical Assistance at 888-366-4276 (Monday through Friday 8-5pm PST) or online at www.microtekelectronics.com

WEM SPECIFICATIONS

RF Modules

RF SECTION

Power Output	1 W EIRP @ 5.3 GHz (maximum) 50 W EIRP @ 5.8 GHz (maximum)
Transmitting Frequency	5.250 – 5.350 GHz (U-NII-2) 5.725 – 5.825 GHz (U-NII-3 / ISM)
Channel Capacity	8 non-overlapping channels 5.3 GHz Band - 5280, 5300, 5320 5.8 GHz Band - 5745, 5765, 5785, 5805, 5825
Modulation	OFDM
Latency	<10 milliseconds
Sensitivity	-82 dBm for maximum data rate
Polarization	Linear, vertical only
Antenna Type & Gain	Omni, 2.5 dBi Small patch, 7.5 dBi @ 5.3 GHz , 7.8 dBi @ 5.8 GHz 6x6 patch, 12.2 dBi @ 5.3 GHz, 16.7 dBi @ 5.8 GHz Small patch in 18" dish, 24 dBi @ 5.8 GHz
Beam Width	Omni-360°, Small patch-90°, 6x6 patch-24° & 18" dish-8°
Data Throughput Rate	Up to 20 Mbps - standard mode, 50+ Mbps – Super mode (3 channels maximum)
FCC ID	JRRWES
Industry Canada	4887A-WES

MANAGEMENT

Interface	10/100 Base T, half/full duplex, rate auto negotiated (802.3 compliant)
Frequency Selection	Rotary switch – channels 0 – 9
Web Browser Interface	User ID/Password, Super Mode, IP Address, WPA2 AES and WEP Encryption
Access Method	Time division duplexing/Time division multiple access (TTD/TDMA)
Protocols Used	IPV4, UDP, TCP, ICMP, Telnet, HTTP, FTP, SNMP *Network Management HTTP*

MECHANICAL

Physical	Environmental, sealed, billet aluminum, powder coated housing with UV stabilized PVC radome
Dimensions	3.6" x 3.6" x 1.75"
Weight	15.2 oz

POWER

Power Requirements	12 - 20 VDC @ 3 W (Reverse voltage protected)
Power Method	Power-over-Ethernet (PoE) via power injector module ("mid-span" compliant – pins 4,5 positive – pins 7,8 ground)
Connector	RJ45 – in and out of power injection box
Cable Specifications	100 Meters (328 Feet) on 24 AWG CAT-5 cable

ENVIRONMENTAL

Humidity	95% non-condensing
Operating Temperature	-20F to +150F

WEM SPECIFICATIONS (cont'd)

Power Injection Module

MECHANICAL
Physical	Plastic housing, not weatherproof
Dimensions	2.6" x 2.6" x 1.1"
Weight	2.5 oz
Interface	2 – RJ45 connectors

POWER
Power Requirements	12 VDC 500 mA (wall transformer supplied)
Power-over-Ethernet (PoE)	PoE "mid-span" compliant (pins 4,5 positive – pins 7,8 ground)
Indicator	LED - red
Connectors	DC Jack 2.5 mm x 5.5 mm center positive, 2 – RJ45

ENVIRONMENTAL
Humidity	95% non-condensing
Operating Temperature	-20F to +150F

System Ranges

POINT-TO-POINT SYSTEMS
Up to 2600 & 3900 Feet	Integral directional patch antennas on both WEMs - 5.3 GHz – 2600 ft, 5.8 GHz – 3900 ft
Up to 2 & 4 Miles	Integral directional 6 x 6 13-dBi patch antennas on both WEMs – 5.3GHz – 2 miles, 5.8 GHz – 4 miles
Up to 30 Miles	Integral directional patch antennas on both WEMs mounted in 25 dBi dish antennas - 5.8 GHz only

MULTI-CONNECT SYSTEMS
Up to 500 & 1000 Feet	Integral omni-directional patch antennas on both the Host AP WEM & Client SU WEM - 5.3 GHz - 500 ft, 5.8 GHz – 1000 ft
Up to 1300 & 2600 Feet	Integral omni-directional patch antenna on the Host AP WEM & integral directional patch antenna(s) on the Client SU WEM(s) - 5.3 GHz 1300 ft, 5.8 GHz - 2600 ft
Up to 2600 & 3900 Feet	Integral directional patch antenna on the Host AP WEM & Client SU WEM(s) - 5.3 GHz – 2600 ft, 5.8 GHz – 3900 ft
Up to 1 & 2 Miles	Integral directional patch antenna on the Host AP WEM & integral directional 6 x 6 13-dBi patch antenna(s) on the Client SU WEM(s) - 5.3GHz – 1 mile, 5.8 GHz – 2 miles
Up to 6 Miles	Integral directional patch antenna on the Host AP WEM & Client SU WEM(s) – Client SU WEM(s) mounted in 25 dBi dish antenna(s) 5.8 GHz only

*For product improvement, design and specifications are subject to change without notice.

TROUBLE SHOOTING

PROBLEM	SUGGESTION
No Link Activity	1. NO POWER – make certain both WEMs have power and the red Power LED is on. Make sure the connected Ethernet/IP device is powered. 2. Check the configuration of all WEMs. Each pair and/or all groups of WEMs setup to communicate with each other must be set to the same channel. If you have changed any of the advanced settings, make sure the configurations of all WEMs being used in the system are the same. 3. Make sure the cable run between the WEM and Ethernet device is no longer than 300 feet. 4. Make sure the cables being used are straight through and all cable connectors are attached properly. 5. If using an Ethernet hub or fast switch, try a crossover cable between the hub and the Power Injector Module.
No Signal Level LED or Flashing Signal Level LED	1. Check line-of-sight of the WEMs. Verify the WEMs are aimed properly. You should have clear, wide-open line of sight between the WEM modules. 2. Change channels; cycle power. 3. Verify sufficient voltage into each PIM. Note: The Host AP WEM green signal level LED will flash indicating the number of Client SU WEMs it is communicating with. This is normal for this device and should not be confused as lack of signal strength. The green LED on the Client SU WEM should be solid if the Client SU is communicating with the Host AP at a full 20Mbps (50+ Mbps – super mode).
All three solid LEDs but no picture or picture drops out after a period of time	1. Check video at the camera 2. Check wiring into encoders or decoders 3. Try changing channels; cycle power. An uninterruptible power supply (UPS) may be required and is suggested. 4. Connect one WEM directly into a PC or laptop and verify that the IP address is accessible. Check the other WEM(s) the same way, then verify that each IP address is accessible over the wireless link into a PC/laptop. 5. Verify the connected Ethernet/IP device is configured correctly.
No Green Signal Level LED (When Using the MLWES-30 with two 18" Parabolic Dishes)	1. Verify wide-open line-of-sight 2. Re-angle your dish antenna in a *downward* angle until both LEDs are solid green. 3. Mount the dishes higher above ground level and/or above any obstruction.

If you have tried the trouble shooting steps above and the system is still not working correctly, please contact MicroTek at 888-366-4276, Monday through Friday, between the hours of 8:00AM and 5:00PM Pacific Time. One of our technicians will work with you to rectify the problem over the phone.

Thank you,
MicroTek Electronics, Inc.

FAQ

Q. Which unit is the transmitter and which is the receiver?

A. WES systems are bi-directional so it is not crucial which of the units is mounted at the receive location (and vice-versa), however, typically the 'host' is the receiver and the 'client' is the transmitter.

Q. How can I tell whether I received the point-to-point WES system versus the point-to-multipoint WES system?

A. There are a few ways to tell which system you have:
1. Each system box is sealed and labeled with the manufacturer's model number. Point-to-multipoint systems have the following model numbers: MLWES-D, MLWES-OD, MLWES-D1-2, MLWES-D6 or single units: MLWAP, MLWAPOM, MLWSUOM, MLWSU, MLWSUP or MLWSUDI
2. The green Signal Level LED on the Access Point (point-to-multipoint systems) will flash to indicate the number of connected Subscriber Units with which it is communicating.
3. If the system box is labeled as: MLWES-2500, MLWES-2-4 or MLWES-30, then the system is a point-to-point system.

Q. Why is one unit labeled as "host" and the other labeled as "client"?

A. The latest revision of the WES firmware enables the WEMs to communicate as one host with either one only or multiple client, or subscribing, units. A host unit is only able to communicate with a client and will not communicate wirelessly with another host.

Q. What is the Locator Program?

A. A software program is available that will locate IP addresses of individual WES modules connected as a system. This program is helpful in case the internal web browser of the WEMs cannot be accessed.

Q. Is it possible to add cameras (or Ethernet devices) to my existing Wireless Ethernet System?

A. The total amount of data that can be transmitted over the wireless system is 20 Mbps (Megabits per second) per channel in standard mode (and 50+ Mbps in super mode). As long as there is bandwidth available in your configuration, more systems can be added to an existing WES system. Contact MicroTek technical support or sales at 888-366-4276 (Weekdays 8am – 5pm PST) for more information since multiple applications are possible.

Q. What is "super mode"? And, when should super mode be used?

A. Super mode combines bandwidth of adjacent channels to provide 50+ Mbps of throughput. However, enabling this mode limits the number of channels that are available for transmission (3 channels available: 3, 6 & 8). This mode is ideal for multiple cameras transmitting over one WES system or to gain bandwidth when transmitting amongst heavy 5 GHz interference.

Q. What does the red dot (sticker) indicate?

A. A red-dot sticker indicates that the 5.3 frequencies are inactive. These units are part of the MLWES-30 or MLWES-D6 systems only. Channel selections 0-4 are combined to match channel 5; ensuring that only 5.8 frequencies are used.

WARRANTY INFORMATION

MicroTek Electronics, Inc.
25691 Atlantic Ocean Drive, Suite B3, Lake Forest, CA 92630
Information Hotline **888-36-MICRO**
www.microtekelectronics.com